

REMARKS

The applicant appreciates the Examiner's thorough examination of the application and requests reexamination and reconsideration of the application in view of the preceding amendments and the following remarks.

The Examiner rejects claims 1, 7-13, 17-20 and 24-28 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,090,458 to *Murakami* in view of U.S. Pat. No. 6,190,458 to *Harada*. The Examiner also rejects claims 2 and 4-6 under 35 U.S.C. 103(a) as being unpatentable over *Murakami* in view of *Harada* and further in view of U.S. Patent No. 5,814,156 to *Elliot et al.* The Examiner further rejects claim 3 under 35 U.S.C. §103(a) as being unpatentable over *Murakami* in view of *Harada* and further in view of U.S. Patent No. 4,624,330 to *Schmidt et al.* The Examiner further rejects claim 14 under 35 U.S.C. §103(a) as being unpatentable over *Murakami* in view of *Harada* and further in view of U.S. Patent No. 5,002,631 to *Giapis et al.* The Examiner further rejects claim 16 under 35 U.S.C. §103(a) as being unpatentable over *Murakami* in view of *Harada* and further in view of U.S. Patent No. 5,204,517 to *Cates et al.* The Examiner further rejects claim 23 under 35 U.S.C. §103(a) as being unpatentable over *Murakami* in view of *Harada* and further in view of U.S. Patent No. 6,374,770 to *Lee et al.*

The Examiner cites *Murakami* as teaching all of the elements of the applicants' claim 1 except the applicants' claimed element of a gas exhaust module inside the reaction chamber.

Murakami, however, does not teach, *inter alia*, the applicants' claimed rectangular beam or beam forming module to transform a UV radiation source raw input into a rectangular beam. The applicants' claimed rectangular beam provides the advantage of a

reaction zone which produces a high degree of reaction uniformity and process efficiency, among other things. See e.g. the applicants' specification at page 6, lines 9-12.

Murakami instead teaches a spot beam having a diameter. See *Murakami* column 7, lines 44-48; column 7, lines 30-35; column 10, lines 9; column 3, lines 29-32.

Thus, *Murakami* fails to teach or suggest -- and in fact teaches away from -- a rectangular beam, and thus fails to teach or suggest the structure, function or advantages of the applicants' claimed invention.¹

Additionally, *Murakami* does not teach a gas exhaust module inside of the chamber, as the Examiner recognizes. One of ordinary skill in the art would recognize the difference between modules and openings or ports, i.e. 102 and the port (unnumbered) from chamber 103 to exhaust gas treatment section 117. See e.g. *Murakami* Fig. 3. See, for example, the secondary reference *Harada*, which teaches either piping 47, 49 with openings to a chamber 41, or "modules" 102, 111 in a(nother) chamber 31. See e.g. *Harada* Fig. 5.

In fact, by explicitly teaching modules outside of the chamber, *Murakami* teaches away from the applicant's claimed gas exhaustion module inside of the chamber.

The secondary reference *Harada* is not helpful in this regard. While *Murakami* teaches away from a gas exhaustion module inside the chamber, as discussed above *Harada* teaches an opening or port to exhaust one chamber, and a "module" to exhaust another chamber. Thus, *Harada* has no clear suggestion or teaching at all.

¹ The *Schmidt et al.* reference which the Examiner cites to reject dependent claim 3 also teaches a (spot) beam having a diameter, i.e. not a rectangular beam. The focal length of 600 mm taught by *Schmidt et al.* is not part of the shape of the beam, but rather the distance from the optical axis of lens 4 to the focal point i.e. the vessel axis. Also, the *Cates et al.* reference, cited by the Examiner to reject claim 16, fails to teach a rectangular beam.

“Combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor’s disclosure as a blueprint for piecing together the prior art to defeat patentability -- the essence of hindsight ...” See *In re Dembiczak*, 175 F.3d 994, 50 USPQ 2d 1614, 1617 (Fed. Cir. 1999) abrogated on other grounds, *In re Gartside*, 203 F.3d 1305, 52 USPQ 2d 1769 (Fed. Cir. 2000) with citations and quotations omitted.

Therefore, the applicants’ submit that any combination of *Murakami* and *Harada* is not based on a suggestion in those references, but instead on impermissible hindsight analysis.

In addition, *Murakami* teaches simply a heater 125, and does not teach a vacuum chuck for holding a substrate as recited in the applicants’ claim 1.

It is clear, therefore, that neither *Murakami* nor *Harada*, nor their combination, teach each and every element of the applicants’ independent claim 1. Claims 2-14, 16-20 and 23-27 depend directly or indirectly from claim 1. Accordingly, the applicants request that the Examiner withdraw the rejections and allow claims 1-14, 16-20 and 23-27 for at least the foregoing reasons. Independent claims 28 and 29 also include a rectangular beam and beam forming module to transform a UV radiation source raw input into a rectangular beam and a gas exhaust module inside of the chamber, and are thus allowable for at least the foregoing reasons.

New claim 34 includes a rectangular beam and beam forming module to transform a UV radiation source raw input into a rectangular beam and a gas exhaust module inside of the chamber, and thus is allowable for at least the foregoing reasons. Additionally, new claim 34 further recites a gas exhaust module to remove reaction by-products and unreacted reactant gas from the substrate surface, wherein said gas injection module and said gas exhaust module are in close proximity to said rectangular beam, and wherein said

rectangular beam, said gas injection module and said gas exhaust module are movable inside said chamber relative to the substrate surface and said chamber. The applicants' invention of claim 34 provides the advantages of a more controllable zone of reaction and minimizes chamber contamination, among other things.

In contrast, *Murakami* teaches that the laser beam, gas supply source, gas inlet port, exhaust outlet port and gas treatment section are stationary and/or fixed to the chamber (and/or outside of the chamber). Only substrate 104 is moveable inside chamber 103 (by way of X-Y stage 112). Thus, all of *Murakami*'s pertinent elements are fixed and stationary relative to the chamber or are outside the chamber, while only the substrate moves. The secondary reference Harada also fails to teach these features.²

Accordingly, the applicants' request that the Examiner allow new claim 34.

² The Examiner cites *Cates et al.* in the rejection of dependent claim 16 for the proposition that *Cates et al.* teaches a rectangular beam, gas injection module and gas exhaust module moving across a stationary substrate.

However, *Cates et al.* teaches a system for monitoring spectral emissions, and does not teach, *inter alia*, a rectangular beam or that the mechanism is in a chamber at all.

The law is clear that the teaching of the desirability of combining references must not come from the applicants' invention. "There must be a reason or suggestion in the art for selecting the procedure used, other than the knowledge learned from the applicant's disclosure". See *In re Dow Chemical Company*, 837 F.2d 469, 473, 5 USPQ 2d 1529, 1532 (Fed. Cir. 1989).

Murakami does not suggest having a laser beam, gas injection module and gas exhaust module moving across a stationary substrate. In fact, *Murakami* suggests the opposite. Conversely, *Cates et al.* does not suggest utilizing the moving apparatus in a reaction chamber, or how to effectuate such a result.

"Combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability -- the essence of hindsight ..." See *In re Dembiczak*, 175 F.3d 994, 50 USPQ 2d 1614, 1617 (Fed. Cir. 1999) abrogated on other grounds, *In re Gartside*, 203 F.3d 1305, 52 USPQ 2d 1769 (Fed. Cir. 2000) with citations and quotations omitted.

Therefore, the applicants' submit that any combination of *Murakami* and *Cates et al.* is and would be based on impermissible hindsight analysis.

New claim 35 includes a rectangular beam and beam forming module to transform a UV radiation source raw input into a rectangular beam and a gas exhaust module inside of the chamber, and thus is allowable for at least the foregoing reasons. Also, new claim 35 recites, *inter alia*, that the gas injection module is in fixed proximity to the rectangular beam and that the gas injection module and the rectangular beam are movable relative to the substrate surface and the chamber. As noted above, *Murakami's* gas supply source, gas inlet port, exhaust outlet port and gas treatment section are stationary and/or fixed to the chamber. Therefore, neither the gas injection module nor the rectangular beam are moveable relative to the substrate surface and the chamber. The secondary reference *Harada* also does not teach these claimed features.³ Accordingly, the applicants request that the Examiner allow new claim 35.

New claim 36 recites also includes the elements of a rectangular beam and beam forming module to transform a UV radiation source raw input into a rectangular beam and a gas exhaust module inside of the chamber, and thus is allowable for at least the foregoing reasons. Moreover, new claim 36 includes a gas exhaust module to remove reaction by-products and unreacted reactant gas from the substrate surface, wherein said rectangular beam and said at least one reactant gas form a reaction zone at or near the substrate surface, said reaction zone movable relative to the substrate and wherein said gas exhaust module is moveable with said reaction zone.

In other words, with the applicants' invention of claim 36, not only is the reaction zone moveable relative to the substrate, but the gas exhaust module is moveable with the reaction zone. In this way also, for example, overall contamination of the chamber is

³ The discussion of *Cates et al.* in footnote 2 applies here as well.

minimized.

This is in sharp contrast to the teachings of *Murakami*, where the exhaust ports and treatment section are not moveable with the “reaction zone”. As taught by *Murakami*, the substrate is driven by the X-Y stage. A “reaction zone”, if any, would exist at or near the point where the laser beam strikes the substrate. Thus, as the substrate moves, the “reaction zone” moves with respect to the substrate. However, *Murakami*’s gas supply source, gas inlet port, exhaust outlet port and gas treatment section are stationary, as is the laser beam.

In other words, while the “reaction zone” may move in any X or Y direction with respect to the substrate, neither *Murakami*’s laser beam, exhaust outlet port nor gas treatment section move (and are not moveable) with the “reaction zone” because it is the substrate that moves. The “reaction zone” is fixed in relation to the chamber, the exhaust ports and the gas treatment section. The secondary and tertiary references *Harada* and *Mannava et al.* also fail to teach these features.⁴ Accordingly, the applicants request that the Examiner allow new claim 36.

CONCLUSION

Accordingly, the applicant submits that claims 1-14, 16-20, 23-27, 29 and 34-36 are in condition for allowance.

Each of Examiner's have been addressed or traversed. Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears

⁴ The discussion of *Cates et al.* in footnote 2 applies here as well.

that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts at (781) 890-5678.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "T. Thompson", written over a horizontal line.

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